



TITLE:

# 1962 : Nuclear Physics & Chemistry

AUTHOR(S):

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CITATION:

1962 : Nuclear Physics & Chemistry. Bulletin of the Institute for Chemical Research, Kyoto University 1964, 41(5-6): 240-241

ISSUE DATE:

1964-02-25

URL:

<http://hdl.handle.net/2433/75988>

RIGHT:

1962

## Nuclear Physics & Chemistry

**Internal conversion of the 1119 keV transition in  $^{65}\text{Cu}$ .** Sakae Shimizu and Yasuyuki Nakayama. *Nuclear Physics*, **31**, 600 (1962).—See, this Bulletin, **40**, 400 (1962).

**Scintillation spectroscopy measurements of gamma-ray energies from the source of  $\text{Eu}^{152,154}$ .** Takeshi Mukoyama and Sakae Shimizu. *Bull. Inst. Chem. Res., Kyoto Univ.*, **40**, 54 (1962).

**Gamma-gamma directional correlations of some gamma ray cascades in  $^{110}\text{Cd}$ .** Takeshi Mukoyama, Fumiyoshi Makino and Sakae Shimizu, *Bull. Inst. Chem. Res., Kyoto Univ.*, **40**, 307 (1962).

**Elastic scattering of protons from  $\text{B}^{11}$ ,  $\text{Al}$ ,  $\text{P}$ ,  $\text{Co}$  and  $\text{Cu}$  from 6 to 7.4 MeV.** Kiichi Kimura, Yoshiaki Uemura, Ryutaro Ishiwari, Jun Kokame, Kiyoji Fukunaga, Akira Katase, Jiro Muto, Isao Kumabe, Hiroshi Ogata, Taro Ohama and Yasuya Ohmori. *J. Phys. Soc. Japan*, **17**, 9 (1962).—See, this Bulletin, **40**, 401 (1960).

**Theoretical studies on the self stability and internal feedbacks transfer functions of boiling water reactor.** Tsuneaki Hamaguchi. *Bull. Inst. Chem. Res., Kyoto Univ.*, **40**, 97 (1962).

**Angular distributions of the alpha particles from the  $(p, \alpha)$  reactions on  $\text{Na}^{23}$  and  $\text{K}^{39}$  at 6.9~7.3 MeV.** Teruo Nakamura, Kunio Takamatsu, Akira Masaike, Sigeru Kakigi, Dai Ca Nguyen, Sukeaki Yamashita and Takuji Yanabu. *J. Phys. Soc. Japan*, **17**, 19 (1962).—See, this Bulletin, **40**, 403 (1962).

**Elastic scattering of protons from  $\text{B}^{11}$ ,  $\text{Al}$ ,  $\text{P}$ ,  $\text{Co}$  and  $\text{Cu}$  from 6 to 7.4 MeV.** Kiichi Kimura, Yoshiaki Uemura, Ryutaro Ishiwari, Jun Kokame, Kiyoji Fukunaga, Akira Katase, Jiro Muto, Isao Kumabe, Hiroshi Ogata, Taro Ohama and Yasuya Ohmori. *J. Phys. Soc. Japan*, **17**, 9 (1962).—See, this Bulletin, **40**, 401 (1962).

**$\text{Al}^{27} (d, \alpha) \text{Mg}^{25}$  reaction at 14.7 MeV.** Takuji Yanabu, Sukeaki Yamashita, Teruo Nakamura, Kunio Takamatsu, Akira Masaike, Shigeru Kakigi, Dai Ca Nguyen and Kiyohiko Takimoto: *J. Phys. Soc. Japan*, **17**, 914 (1962).—See, this Bulletin, **40**, 403 (1962).

**$(d, \alpha)$  Reactions on  $\text{F}^{19}$ ,  $\text{Ne}^{20}$ ,  $\text{P}^{31}$  and  $\text{S}^{32}$  at 14.7 MeV.** Kunio Takamatsu. *J. Phys. Soc. Japan*, **17**, 896 (1962).—The angular distributions of the emitted alpha particles from the  $(d, \alpha)$  reactions on  $\text{F}^{19}$ ,  $\text{Ne}^{20}$ ,  $\text{P}^{31}$  and  $\text{S}^{32}$  leading to the ground

states and several excited states of the residual nuclei have been measured at an incident deuteron energy of 14.7 MeV. The emitted alpha particles were detected with a solid state detector of a silicon p-n junction. The alpha particle groups,  $\alpha_0$  of the ground state transitions for all targets and the alpha particle groups of several excited state transitions for  $F^{19}$  and  $S^{32}$  show pronounced peaks at forward angles and oscillatory behavior in the angular distributions, which were compared, and were in good agreement, with the theory of the two nucleon pickup process. The angular distributions of other alpha particle groups for excited state transitions show nearly symmetrical behavior about  $90^\circ$  and the cross sections of them are smaller by about a factor of 2~5 than those of  $\alpha_0$ . These facts suggest that these reactions occur through different process other than the surface direct interaction process, and are consistent with the level structures of residual nuclei predicted from the shell model. The mass number dependence of the integrated cross sections for the ground state transitions was obtained. The values of the cross sections are proportional to the inverse cubes of mass number  $A$  and the values of the cross sections for even-even nuclei are larger by about a factor of 3 than those for odd-odd and odd nuclei, in the mass region  $14 \leq A \leq 32$ .

### Analytical Chemistry

**Determination of cadmium in sea-water.** Masayoshi Ishibashi, Tsunenobu Shigematsu, Masayuki Tabushi, Yasuharu Nishikawa and Shiro Goda. *Nippon Kagaku Zasshi*, **83**, 295 (1962), in Japanese.—Quantitative determination of cadmium in sea-water was carried out colorimetrically by 1-(2-pyridyl-azo)-2-naphthol "PAN" method. In 40~60 l. of sea-water, 400~600ml. of conc. HCl and 30mg. of Cu as  $CuSO_4$  solution were added.  $H_2S$  was passed in and the solution was allowed to stand for 2~3 days. Cadmium in the sample was coprecipitated with CuS nearly completely. The precipitate was filtered and dissolved in 30~50ml. of aqua regia, and the solution was evaporated to dryness. The residue was treated with 10ml. of 0.1N HCl and the solution was introduced onto an ionexchange column (Dowex 50, 50~100 mesh,  $15 \times 125$  mm.) at a flow rate of 1 ml./min. Cadmium was separated from copper by eluting with 100 ml. of 0.5N HCl solution. To the effluent, 0.5 ml. of 0.1% PAN solution, 5ml. of 10%  $NH_4Ac$  solution and 1.5g. of NaCl were added and Cd-PAN complex formed was extracted with 20 ml. of  $C_6H_6$  at pH 9.5. The absorbance of the resultant colored benzene layer was measured at  $555m\mu$ . In this procedure, the recovery of cadmium was found to be about 90%. Cadmium content in the sea-water offshore of Shirahama, Wakayama Pref. and at the coast of Hamadera, Osaka Pref., Japan was found to be  $0.08 \sim 0.17 \mu g/l$ : the mean value was  $0.1 \mu g./l$ . The cadmium content in several marine plants and animals was also determined and found to be in the range from  $2.5 \times 10^{-4} \%$  to  $18.4 \times 10^{-4} \%$  of its ash samples.

**Gallium content in rocks and minerals.** Tsunenobu Shigematsu, Yasuharu Nishikawa and Keizo Hiraki. *Nippon Kagaku Zasshi*, **83**, 444 (1962), in Japanese.—Gallium content in 92 samples of rocks and minerals was determined and the